

CARNIVOROUS PLANT NEWSLETTER

VOLUME 25, NUMBER 2

JUNE 1996

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Official Journal of the
International Carnivorous
Plant Society

Volume 25, Number 2
June 1996



Front cover: *Utricularia neottioides* covering a streambed at the Chapada dos Veadeiros, Brazil. Photo by Fernando Rivadavia.

Rear Cover: *Utricularia tricolor* flower. Photo by R.B. Roth of Scottsville, Natal, South Africa.

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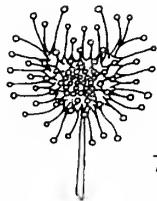
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PUBLISHER: The International Carnivorous Plant Society by the Fullerton Arboretum, California State University, Fullerton, CA 92634. Published quarterly with one volume annually. Desktop Publishing: Steve Baker, Rt. 1, Box 540-19AB, Conover, NC 28613. Printer: Kandid Litho, 1077 East Enda Place, Covina, CA 91724. Masthead Art: Paul Milauskas, 38 Manchester Court, Fox River Grove, IL 60021. Dues: \$15.00 annually, \$20.00 foreign. Reprints available by volume only © 1996 Carnivorous Plant Newsletter. All rights reserved. ISSN #0190-9215. Circulation 865 yearly.

The Savage Garden

“Cape Sundews”



by
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It seems as though every genus of plants found in horticulture has one or two outstanding species that combine the attributes of both beauty and ease of growth. Thus, we have *Dieffenbachia maculata* among the dumb canes; *Howea fosteriana*, the Kentia, among the palms; *Philodendron selloum* or *oxycardium* from the philodendrons and *Aechmea fasciata* from the bromeliads. The list, of course, goes on and on. These are the plants that crowd our homes and plant shops, mass-produced to the point of tedium, taken for granted by the collector, yet the starting point for the novice.

Among the group of carnivorous plants, the venus flytrap is certainly number one, yet each genus of carnivores has its own outstanding species, the plant or plants that represent its tribe. Among the *Sarracenia*, no doubt, the winners are *S. purpurea* and *flava*, among the *Nepenthes* perhaps *N. alata* or *gracilis* or *ventricosa*..

From the genus *Drosera*, the sundews, the award-without a doubt-goes to *Drosera capensis*, the cape sundew. This magnificent sundew is often the first drosera an enthusiast starts with, along with its “companions”, the venus flytrap and purple pitcher plant. Awe-inspiring when first seen, this prince (or princess) of sundews, a dream plant when first grown, has the ironic distinction of later turning into a nightmare, a plague of weeds that will spread through a greenhouse or big garden, contaminating every other pot in its path, smothering a collection with capes, capes and more capes, breeding on and on, more and more, here, there, everywhere!

My hysteria is justified by anyone who has grown this plant!

I have vivid memories of my experience with cape sundews. One is the first time I laid eyes on a *D. capensis*.. I was a teenager, the place was the Conservatory of Flowers in Golden Gate Park in San Francisco. I stood awe-struck at a little bog garden they had on display, some *Sarracenia*, some *Dionaea* and cape sundews. Previously my only experience with drosera had been the usually diminutive native plants of North America, yet here were GIANT sundews twelve inches across and just as tall, with wide, dewy, strap-shaped leaves that twisted around their prey! Wow! My second memory is of a few years later, in the greenhouse of a well-known collector. To my horror, he was plucking beautiful, glittering, baby cape sundews out of pots of his prized nepenthes, tossing them with disdain to the floor, grinding them to a smeary pulp with the heel of his shoe in the gravel. “Damn weeds,” he sneered.

Cape sundews come from the Cape Province of South Africa. This small area of the world is famous for countless varieties of horticultural plants grown throughout the world, including some famous CP. The climate can best be described as a warm-temperate or mediterranean. This means cool, wet winters and warm, dry summers, light frost if any, and a coastline that is often shrouded with chilly fog. Many other

sundews come from the same general area, such as *D. aliciae* and *regia* and *slackii*, which are some of the most popular of sundews to grow.

Although *D. capensis* is one species, many forms of the plant exist. These forms or varieties go under many common names or 'nicknames' bestowed upon them by growers for convenience. We will have to wait for a good monograph on *Drosera* to be published to sort out all of these forms, and perhaps legitimize them as true varieties or even subspecies.

Here I will discuss four plants strictly from a horticultural perspective.

The most common variety grown is probably the "regular" cape sundew, known as "wide-leaved" or "stem-forming". This plant has a scrambling stem that trails along the ground or climbs among other plants, usually cloaked with dead leaves of previous seasons. The petiole or leaf stem is rather wide, the blade even wider, covered with many red tentacles. The entire crown of leaves is usually about eight inches across, but may be broader than twelve inches in ideal situations, a large sundew indeed. The inflorescence appear on a stalk from one to two feet long, the flowers are bright pink and around 3/4 inches wide. Dozens of flowers may appear, usually one opening every day or so. The flowers open in strong sun and usually produce hundreds of seed that readily germinate within weeks or months on wet peaty soils.

If a single regular cape sundew is left alone, it rarely produces off-shoots and the stem can reach twelve inches or more in length in a few years, looking somewhat like a palm tree. However, if the crown is cut off or killed back by frost, shoots will appear along the base and the plant will clump, sending several stems in a loose rosetted pattern. Repeated trimming or frosting can result in a rather large, bushy, branching clone, startling in its size and beauty. I have one such plant I have been growing in the same 10-inch pot for over a decade now, and it must have over 50 heads on it.

The other three forms of *D. capensis* I wish to discuss are co-called narrow-leaved forms. These plants usually form short stems no more than an inch or two high after many years, but may get taller. The petiole and leaf-blade are narrow, and overall form a neater, more symmetrical plant. They don't usually clump, but severed roots will send up additional plants and damaged crowns will produce off-shoots.

The common narrow-leaved cape sundew has green leaves with red tentacles and pink flowers, like the stem-forming variety. The red cape sundew looks in shape and size like the common narrow-leaved, but the whole plant turns a stunning dark red in strong light and the flowers are a darker pink. The white cape sundew, usually called 'alba', is somewhat different in that the leaves are narrow but it will gradually form a stem rivalling the wide-leaved variety. The flowers are white, the leaves green, tentacles almost transparent, while the glands are pale pink.

Cape sundews are very easy to grow. Their basic cultivation requirements are as follows: Grow them in a soil recipe of roughly 1/2 sphagnum peat moss to 1/2 horticultural sand and/or perlite. Capes are very tolerant of other low-nutrient, acidic soils. Long-fibered sphagnum moss or milled sphagnum are excellent. They will also grow in pure peat. Grow cape sundews as container plants. The soil must be kept damp to waterlogged, and as with most CP, the "wetter the better". Sit the pot in a saucer of water. The water can fluctuate from the top of the pot to the bottom, but try to maintain a level averaging 1-2 inches. If grown in an undrained container, keep the soil wet.

Cape sundews require at least a few hours of direct sun for best growth. They do well in full sun if kept very wet. They look poor in shade. Place them on sunny windowsills, partly sunny decks or patios, or in greenhouses. If you have them under

flourescent grow-lights, use at least two bulbs and place them 6-12 inches under the bulbs on a 12 to 14 hour photo-period.

Water with only purified water. That means distilled water, or water that has been deionized or gone through a reverse-osmosis system. Rain water is excellent.

Never fertilize through the roots. Miracid or an epiphitic, or orchid 30-10-10 fertilizer may be diluted to about 1/4th strength and lightly misted on the leaves about once every month or two.

Cape sundews grow best in a temperature range of about 50F to 80F. They are extremely tolerant of a range of 32F to 100F. They will die back unprotected in frost below about 27F, but the roots can survive brief freezing to at least 15F. They greatly appreciate cool summer nights, and may not appear happy in permanently "tropical" conditions.

Typically, in ideal situations, cape sundews look best in late winter and spring. They use a lot of energy flowering in spring and summer, and crowns may shrink considerably by fall. In the wilds of South Africa, they grow in permanently wet areas that become drier before the winter rains begin.

Insect food greatly benefits these plants, but foliar fertilizer or dried insects from pet shops can be applied to the leaves. Cape sundews will even eat bits of chocolate or cheese, but they may suffer indigestion and leaves may rot.

Aphids are the primary pest, especially when grown outdoors. Apply Orthene, Diazanon, or Malathion, and try to direct the spray onto the newly developing leaves only, avoiding spraying the whole plant and soil. Twisted, deformed leaves are almost always a sign of aphid damage. In the home or terrarium, flea collars placed beside the plant can eliminate the pests but avoid contact with soil.

Here are ways to propagate cape sundews:

Leave them alone. Scattered seed will appear in any nearby pot of wet, peat-based soil.

Cut the thick black roots into 1-3 inch pieces and lay horizontally under 1/2 inch of required soil. Keep wet, in bright light and covered with seed tray domes or clear plastic bags. Plantlets will appear in weeks at moderate temperatures.

Cut off a leaf where the petiole meets the stem and lay the leaf tenticle-side up on wet peat or sphagnum. Keep the leaf under high humidity and in bright light as with root cuttings. Plantlets will appear along leaf blades in weeks. Secure leaves with pinches of moss, but do not bury.

Float leaves in cups of purified water in a bright, humid environment. Plantlets will appear in weeks, and can be divided and potted when roots appear.

If you cut the crown of a regular cape sundew to produce off-shoots along the stem. place the severed crown in a cup of pure water and it will usually send out roots. If you don't want the plants to contaminate your collections, remove the flower stalks when they are a few inches long.

Here are some things you can do with cape sundews:

For a decorative look, use plastic or glazed pottery of colors that will compliment the type of capes you wish to grow. Green-leaved, red-tenticled plants look great in green and/or red pots. Glazed black pottery is an excellent choice for all-red capes, especially with a ground-cover of live, bright green sphagnum. For a beautiful display, grow a pot full of mixed *capensis* 'red' and *capensis* 'white'. Your neighbors will faint.

Another effective combination is growing capes with other CP of a similar color scheme. For example, red capes are complimented with a ground cover of other red sundews of the rosetted variety, such as *D. slackii*. A beautiful combination are white pots or "crystal" glass pots planted with *D. capensis* 'alba', *D. filiformis* var *tracyi*, pale forms of *D. burmanni*, *Byblis liniflora*, all-green *Dionaea m.* 'heterodoxa', or other non-red plants. On the other hand, all-red plants may be grown together, or combined with other 'alba' forms. Such example as a black glazed pot planted with all-red venus flytraps, red capes, and *D. slackii*. How about red capes grown with a ground cover of *Utricularia sandersonii*.

Cape sundews themselves make a beautiful ground cover in large pots of tall *Sarracenia* grown on your deck or in the greenhouse. White cape sundews planted around a *S. flava* 'burgundy' will bring out the red of the pitcher plant. The greens and reds of *D. capensis* 'narrow' compliment the same colors of most *Sarracenia* varieties. *S. leucophylla* of the red-and-white form look superb when surrounded by all-white and all-red capes.

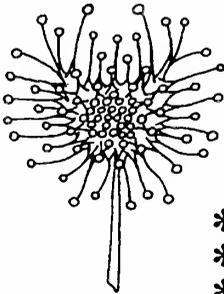
If you want a 'palm tree' look, grow a stem-forming cape in a terrarium under grow-lights for a couple of years and trim off the "thatch" of old dead leaves. Remove flowers when they appear to prevent seedling growth. Stake the plant if it becomes top-heavy with wooden skewers.

If you want the bushy-look, grow the stem variety and decapitate it in late winter. The following year prune a few of its resulting off-shoots and repeat occasionally to produce many crowns.

The stem-forming variety also makes a great hanging-pot display, as the stems will hang and droop over the pot's edges, looking bushy and fern-like.

To this day, I cannot kill a cape sundew. Sure, they come up like weeds in many of my other pots, but when I pluck 'em out they usually return from broken roots. I'll drop the plucked plants into bowls of water where they will grow 'aquatically' for weeks until I get the time to pot them up. Give them away to friends or schools! Cape sundews are a rewarding beginners plant. But they can still make long-time growers like me pause and admire them for their vigor and beauty.

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The Hooded Pitcher Plant, *Sarracenia minor* Walt., at its Southern Limit

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Abstract

A new station for *Sarracenia minor* Walt. is reported at the species southern limit in Okeechobee County, Florida, and a comprehensive distribution map of the taxon is presented. Approximately one thousand plants occur at this site which is classified as a wet flatwoods ecotone bordering a depression marsh. The short term effects of pasturing whereby woody vegetation is removed and suppressed are contrasted with the long term effects of soil compaction, fertilization, introduction of weedy plant species and alteration of original bog plant community.

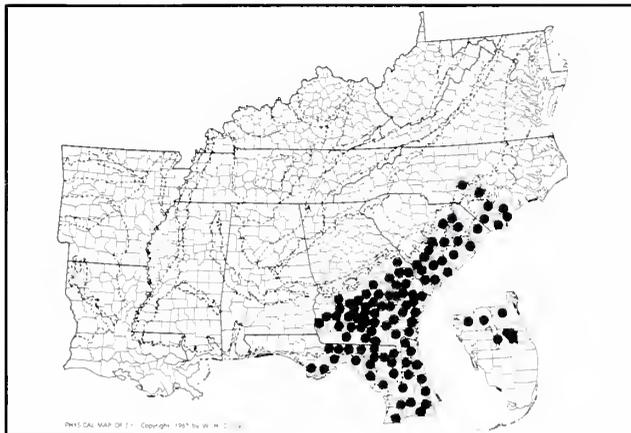


Figure 1. Distribution of *S. minor*. Shaded county is Okeechobee. Distribution based on Herman (no date), McDaniel (1966), Sheridan #657 Tattnall Co., Ga. FTG and #652 Appling Co., Ga. FTG and Bridges & Orzell #'s 17539 Appling Co., Ga., 17557 Atkinson Co., Ga., 17359 Colquitt Co., Ga., 17734 Tattnall Co., Ga. and 18371 Turner Co., Ga. at FTG. Physical Map of S E used with permission of W.H. Duncan.

Introduction

On January 7, 1995, Clyde Bramblett, Manny Herrera and I were taken by Bruce Bednar to a site he had recently discovered in Okeechobee County, Florida for *S. minor*. This location represents the southern most point for this species and the genus *Sarracenia*. I was in Miami giving a talk at Fairchild Tropical Gardens on my *Sarracenia* genetics work as well as donating my entire herbarium collection to the gardens, and took advantage of the chance to see other horticulturists and natural areas while in the area.



Figure 2. Americas most wanted plant hunters. Pulled over by the police as murder suspects. Left to right are Bruce Bednar, Manny Herrera and Clyde Bramblett kneeling behind *S. minor* at its southern limit in Okeechobee County, Florida. Herbarium specimens deposited at FTG, Sheridan 1838.

Discussion

Sarracenia minor ranges from North Carolina to the southern part of Florida (Fig. 1). The *S. minor* site we visited occurs in Okeechobee County a few miles from Lake Okeechobee at the southern limit of the species. It is a pastured former wet flatwoods seepage ecotone which grades to a thicket of *Serenoa repens* (Bartram) Small and *Pinus elliotii* Engelm. above a depression marsh dominated by *Pontederia cordata* L. Approximately 1000 pitcher plant clumps were observed with a few individuals in flower. Typical associate seepage species included *Drosera capillaris* Poirlet, *Eriocaulon decangulare* L., *Pinguicula* sp. and *Lycopodium alopecuroides* L.

There are several factors which together or independently may explain why *S. minor* does not reach further down the Florida peninsula. In the vicinity of Lake Okeechobee, wet acid flatwoods can be found which are typical *S. minor* habitat. South of this region is a shallow basin with heavily silted marl soils (Schnell, 1980) which would be inhospitable to *S. minor* due to their alkaline pH. Wet acid pinelands, however, can be found on the eastern and western regions of this basin which could support *S. minor*. This suggests that soil conditions are not the only limiting factor in the species southern range. Schnell (pers. comm. 1995) reports that *Sarracenia* growers in the Miami area experience rotting of the rhizomes due to lack of dormancy. Thus unsuitable soils and non-dormancy caused by warm weather may be major factors prohibiting the spread of the genus *Sarracenia* further south.

Pasturing is generally believed to be beneficial to pitcher plant bogs (Schnell, 1994). Herbivores seem to avoid eating the pitcher leaves, possibly because of color, scent, unpalatability or other factors. Paralyzing alkaloids, such as coniine which was isolated from *S. flava* by Mody et al. (1976), may also occur in *S. minor* and deter browsers from consuming the plants.

The Okeechobee County *S. minor* site would initially seem to support the hypothesis of a positive association between pasturing and pitcher plants based on the vigor of the clumps. Without fire maintaining open conditions in pitcher plant bogs, pasturing may allow *Sarracenia* to persist for some time. However in the *long run* cattle or practices associated with their care may ultimately destroy the plant community of which pitcher plants are a part. I have seen the results of this in Virginia with a pastured *S. flava* site discovered by M.L. Fernald in 1937 called Gary's Church Bog. This pitcher plant site originally covered several acres and has now been reduced to a couple of plants from pasturing. In addition, many of the associate bog rarities have also been eliminated. I also see the same sequence of events occurring in several Florida pitcher plant bogs. Initially, cattle open the shrub bog community in which pitcher plants may occur and we see vigorous growth of *Sarracenia*. The landowner then starts removing trees and shrubs which may also be temporarily beneficial. At this point many people see what appears to be a healthy pitcher plant bog but in fact the seeds of destruction have already been sown. The cattle begin to compact and rut the soil changing seepage conditions. Seedlings are crushed underfoot. The cattle then complete some of their more insidious work by defecating in the bog which spreads weedy species in their cow pies and enriches the soil. The final coup de grace is usually completed by the landowner who installs drain tile in the bog or limes the soil to "improve" the pasture. I have actually seen a pastured bog where the landowner told me he spread lime along a transect. The *Sarracenia* were completely absent from this limed lane where I had seen them a couple of years before but still grew in the rest of the pasture off the limed area. Bill Scholl and I still saw the negative effects of pasturing in soil compaction and drainage of wetland by cattle ruts. These two factors may have caused reduction and elimination of pitcher clumps in the unlimed area where there had once been dense stands.

It is important to keep in mind that the effects of pasturing may be a *long term* phenomenon dependent on herbivore density and associated management practices. It is possible that in some cases it may be the only option for a given area but in general I would not recommend it if prescribed burning were available. The damage done to the Gary's Church Bog in Virginia occurred over almost a sixty year period. The photograph of the North Carolina *S. rubra* ssp. *jonesii* site cited by Schnell (1994) looks

robust even after the prohibition of cattle. Bill Scholl and I visited this same site in the late 1980's and although large clones could still be found succession was well under way. I did notice a significant amount of smartweed (*Polygonum* spp.) and woody species shading the pitchers. I consider *Polygonum* to be a weedy, competitive species introduced or accentuated by the disturbance caused by pasturing. In the absence of any other management initiative low grade pasturing may be the lesser of evils for this particular site. I was once with the famous botanist Edwin Bridges in a steep hillside seepage bog of *S. alata* in a National Forest in western Louisiana. As we hiked through the site, which had burned over the winter, we found that the forest service had permitted cows to graze the bog. Pasturing in this steep slope bog was resulting in ruts and enrichment from the cows droppings. Edwin's comment in disgust was "This is completely unacceptable!"

As a final note I should mention an interesting experience we had while exploring this *S. minor* site in south Florida. When we were leaving this bog a car slowed down and stopped to observe what was going on. We drove down the road and explored another area but were forced to make a running exit due to an approaching lightning storm. At this time several murderers had made a daring escape from a local correctional facility and we were promptly pulled over by the local police as possible suspects (Fig. 2). Somebody had reported us as the escapees running out of the woods. Fortunately an error had been made and the day ended on a happy note.

Acknowledgements

Thanks to Don Schnell, Bruce Bednar, Clyde Bramblett and Manny Herrera for their review and comment. Appreciation is also extended to Media Production Services of Virginia Commonwealth University for preparing slide of *S. minor* distribution.

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Nepenthes of Gunung Murud

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During our visit to Mulu National Park (Sarawak, Malaysia) and to Batu Lawi in the Kelabit Highlands we had seen a major summit in the distance. The mountain in question is Gunung Murud. Different sources confirm the presence of nepenthes on the summit and talk about a great variety of plant life. Our guide for Gunung Mulu also suggested that a nepenthes similar to *N. muluensis* appeared on Murud. So in planning our tour through Kalimantan and Sarawak, we scheduled for Gunung Murud.

The whole tour took my wife and myself to the Kelam in Kalimantan, to Kuching and surroundings in Sarawak and to the Kelabit Highlands.

Gunung Murud is at 2423 m (7946 ft) the highest summit in Sarawak. Historically, the first ascent was made in 1922 after a five week march from the coast. The mountain is part of the Kelabit Highland range and lies about 180 km from the sea. The lowest



Figure 1. *Nepenthes stenophylla* (?) on ascent to Murud. Photo by John De Witte.



Figure 2. *Nepenthes tentaculata* close to Murud summit. Photo by John De Witte.

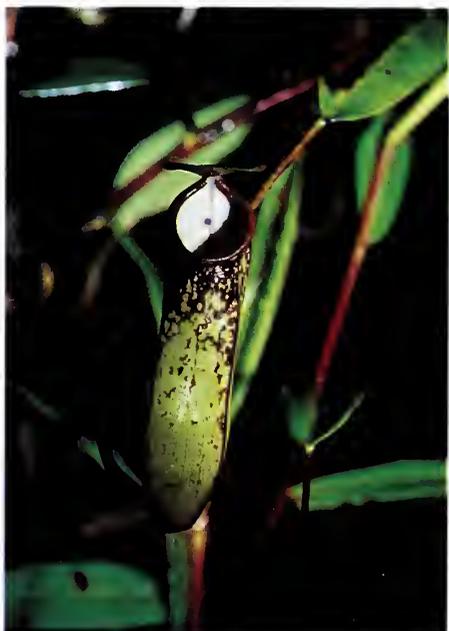


Figure 3. *Nepenthes muluensis* relative on slopes of Murud. Photo by John De Witte.

part of the mountain spills over into Kalimantan (Indonesia). Access to the mountain is either from Sarawak or from Sabah.

Our starting point was to be Miri, where we picked up our guide. From there on we planned to fly to Bareo, the main longhouse center in the highlands at an altitude from 1000 meter. There we could look for *N. stenophylla*, *N. reinwardtiana* and *N. veitchii*, plants we saw on a previous trip but wanted to photograph again. The *N. veitchii* from Bareo is intermediate between the lowland version as found in the foothills of Gunung Mulu (pure epiphytes) and the highland version of Batu Lawi which typically clasp the trees in growing taller. The plants grow in a dry soil on the side of the road among shrubs and short trees and are rarely taller than 0.75 meter.

Bareo has an airfield with a grass runway and is serviced by Twin Otter planes, so when it rains the town cannot be reached. The first time we were in Bareo the field was just opened after being totally closed for one month. Of course when we were ready to leave for the highlands this

time it rained, so we had to look for an alternative.

Fortunately, Gunung Murud can be climbed from the Sabah side. The nearest village, Ba'kelalan, has a hard runway and can be reached via Lawas.

Flying in over the highland range into Ba'kelalan was impressive. The village at an altitude of 1000 meter has no longhouses anymore, and is spread over different hamlets. It is surrounded by numerous hills, and in the distance the Murud range can be seen. As we came in the morning, we had time for an afternoon walk. With a temperature of 23 deg C and slight overcast this was more agreeable than walking in the lowlands. The landscape reminds one of meadows crossed by small brooks and many of the trees carry ant plants and epiphytic orchids. After half an hour we arrived at a small forest and found *N. reinwardtiana*. As usual at this altitude, the nepenthes were growing among rhododendrons and were climbing high in the trees.

Next morning we had an early start and followed the runway in westerly direction. The first part of the hills were steep and we climbed 200 vertical meter in the first 30 minutes, which proved hard for a starter. Fortunately, after the climb we found a flatter stretch at an altitude of around 1300 meter. At this level there is no rain forest yet and we walked through tropical oak forest. We scaled the ridge and after the midday break we lost altitude again till we reached a logging road. A logging road is a stretch of forest 15 meter wide where all trees have been cleared so trucks and transporters can pass to take out the cut trees. Rain caused erosion and at many locations land slides had taken out part of the forest and blocked the road. Rain also caused the clay to stick to our shoes, tripling their weight and making walking very difficult. We saw no nepenthes that day, apart from a single pitcher, but unfortunately the dry state made correct determination impossible. From the single pitcher, however, we saw a similarity with the species which goes under the umbrella of *N. stenophylla* at the first ridge of Gunung Api (Mulu National Park). The same red color was apparent on the remaining parts of the pitchers. We descended again (funny how easy we always seemed to lose the altitude we just had laboriously gained) and camped for the night at a small river.

After a rainy night under tarpaulins we continued west through the oak forest. In the middle of the morning at 1400 meter we found our first nepenthes, a single plant. The first impression was *N. stenophylla*. The difference between it and the same species from Bareo however is striking. The lid is more triangular than circular and the hairiness is less. Comparing descriptions and illustrations leave the possibility that this could be the original *N. fusca* as described by Danser, and there are similarities with *N. fusca* as seen on the road to Mount Kinabalu. From that point till midday, that was the only plant we saw. Then at 1730 meter the first *N. tentaculata* appeared. This species is widely distributed, and in our opinion there are small but characteristic differences between the species on each mountain.

Fifty meter higher, a species appeared that surely belongs to the maxima family, with pitchers up to 30 cm. No records are available about *N. maxima* on Gunung Murud. The hairiness of the leaves point toward *N. veitchii*, and although we might have seen some pure strains the variation in shape of the leaves and pitchers indicate that there are at least two types of hybrids involved, most probably between *N. veitchii* and *N. stenophylla* or *N. fusca*. The shapes of some leaves even suggest presence of *N. lowii* (comparable to *N. x trusmiensis*), but this seems improbable.

The higher we climbed, the larger the pitchers of *N. tentaculata* seemed to grow. They soon reached 20 cm, which is unusual for this species.

Going slowly higher on a well trodden path we found *N. lowii* at 1860 m. The reason for the path was simple: a fundamentalist Christian movement has developed in Ba'kelalan, and Gunung Murud in a place where the villagers go to meditate and pray. They have built a second village with a large church on a plateau, so on special occasions the whole community can go up and stay for a couple of days. For the rest of the year

the buildings stand empty. This village was to be our base camp, as our guide's family lived in Ba'kelalan and of course had a house in Church Camp.

Slightly higher than the *N. lowii*, we found a nepenthes which also looked familiar. Obviously it belonged to the *N. tentaculata* group, and the coloration reminded us of it's relative on Gunung Mulu: *N. muluensis*.

Where on Mulu the plants grow on the summit exposed in the crowns of the trees and bushes, on Murud they grow in the shade of the mossy forest. The plants on Murud are darker, most probably due to the continuous exposure to UV-light at higher altitude. Comparing pictures of both plants leaves no doubt that we are looking at the same species and that *N. muluensis* also appears on Gunung Murud. It remains to be clarified if the species appears in the 75 kilometre that separate both mountains.

The *tentaculata* grow even larger close to the ridge, but the pitchers become so different from the normal ones that we had to think that we were looking at another species. The largest pitchers were now 30 cm, with a more round peristome and no hair on the lid. This could be sufficient difference to constitute a separate species or a hybrid. And surprisingly we found *N. reinwardtiana* close to the ridge. According to Danser this species is normally found at lower altitudes (below 1200 meter) although there is one reference to Batu Lawi, which is above 1500 meter. Nevertheless it is indeed *N. reinwardtiana*, as witnessed by the two characteristic "eyes". And it is also the other parent of the hybrid we found earlier. By comparing pitchers, we could find discern the characteristics of both parents in the hybrid.

Rain had started, and we hurried down from the ridge at 2130 meter for a descent of half an hour to the Church Camp at 1980 meter. Nobody was there and we were living in a ghost town for the next couple of days. At this altitude the day temperatures were around 18 deg C, going down to 12 deg C in the evenings.

After a chilly night we started the walk to the top. As usual however, we first went down through a small mossy forest to a stream and followed that to the riverbed. After a stretch of bare rock we found nepenthes, again the same species as the day before. *N. muluensis* appears at 2200 meter and becomes more like the relative from Mulu. The *N. tentaculata* have the largest pitchers we have ever seen, reaching 35 cm, but the plants barely grow higher than the pitchers themselves. The same stunted growth is apparent in the *N. lowii* which occupy the same site. This growth is most probably due to the harsher weather conditions at the top and the complete absence of protecting forest. The nepenthes have no possibility of climbing high and are forced to exist as ground dwellers. On the way back, the traditional afternoon rain starts and the Church Camp almost disappears in the fog.

Next day, we took it easy, climbing back to the ridge to take pictures. For the first time we see a squirrel drinking from a *lowii* pitcher. Hearing whistling, we search for the source, and are drawn to ground pitchers of *n. tentaculata* embedded in the moss. The sound comes from a pair of tree frogs which apparently take shelter in the pitchers. After finding the first we hear more and can easily spot them in the same area. The mossy forest stops below the top of the ridge, and a small alpine landscape appears. On the other side of the ridge the mossy forest reappears.

It looks like the rainy season has started a bit early and we are facing an important decision. If we continue to Bareo we risk the airfield being closed and we will have to walk for days back to the next field. So we decide to walk back to Ba'kelalan, leaving in the early morning well before the guides. As both my wife and myself do not like coming down the same way as going up - it can be boring - we convinced our guides to take the two day walk back in a single day. So we set a good pace, turned at the ridge and started losing altitude quickly. The path became unknown, and no nepenthes appeared where we expected them. A compass and the shade of the ridge in the distance kept us in the right direction, but we considered turning back. We had already gone down 500 meter, so would need at least two hours to recover that distance. This would mean we had to stay another night in the forest. So we continued following the

sound of a little brook which we assumed would end up in the river close to the camp of the first night. And indeed we reached a junction with the old path and waited for the guides. Luckily for one day we had no rain and the logging road was dry enough to walk without too much difficulty. Again we were astonished by the erosion taking place at the sides of the road. We finally reached Ba'kelalan in the evening.

We continued the trip to Gunung Silam looking for *N. macrovulgaris*, photographed *N. vilosa* and *N. kinabaluensis* on Kinabalu mountain, and then relaxed in Singapore before flying home.

International Carnivorous Plant Conference May 16-20, 1997

hosted by

Atlanta Botanical Garden and the International Carnivorous Plant Society

Held at The Atlanta Botanical Garden, Atlanta, Georgia, USA

Proposed Agenda

Thursday, 15 May

6.30pm

Welcome buffet & late registration

Friday, 16 May

8.00am-6.30pm

day

6 Speakers from around the world featured throughout the followed by a poster session, plant sale (only artificially propagated plants) and ABG cp collection tour

Saturday, 17 May

8.00am-5.00pm

6 Speakers throughout the day followed by ABG cp collection tour

Sunday, 18 May

8.30am-3.45pm

6 Speakers throughout the day

Monday, 19 May -

Tuesday, 20 May

Two day field trip to visit cps in Georgia and surrounding states

Registration

Registration will cover welcome buffet, continental breakfast, breaks and box lunch and drink throughout the conference

*Registration **\$65.00**

*Field Trip (limited to 50 places) **\$120.00**(inclusive of accommodation, travel and food)

The conference organizers are not responsible for securing plant import/export permits and all delegates are responsible for travel, medical, and car rental insurance.

Please address inquiries to:

International Carnivorous Plant Conference,
c/o Steve Baker, Rt. 1, Box 540-19AB, Conover, NC 28613,
Day: 704-322-2050 9am - 5pm, Evening: 704-256-7035 7pm - 10pm

Utricularia neottioides ✓

Fernando Rivadavia, Rua Inacio Pedroso 230, C.E.P.,
05612-050, Sao Paulo, S.P. Brazil

Utricularia neottioides is a bizarre species native to the South American countries of Colombia, Venezuela, Bolivia, and Brazil (Taylor 1989). It grows anchored to rocks submerged by flowing water in cold mountain streams, a habit called rheophytic (Taylor 1989). I've observed on my trips around Brazil that *U. neottioides* prefers the acidic, Coca-Cola-colored waters common of streams flowing down from sandstone highlands. As I've been told, this acidity and bizarre color are a result of the tannic acid present in the water. The water may look dirty to most people, but is actually almost sterile and excellent for drinking, especially since it's usually extremely cold!

I've found *U. neottioides* growing at the Caraça Range, Cipó Range, around the town of Diamantina (all three in central Minas Gerais state), Canastra Range (southwestern M.Gerais), around the villages of Grão Mogol and Itacambira (both in northern M.Gerais), Ibitipoca Range (southeastern M.Gerais), Chapada dos Veadeiros (northern Goiás state, bordering the new state of Tocantins, which covers the top half of the old Goiás), Chapada dos Guimarães (southern Mato Grosso state), and have seen herbarium from many other localities in Brazil.

U. neottioides flowers more profusely in shallow, slow-flowing water, most often during the dry season, though it can be found flowering all year long. During the wet season, the bare, stiff stolons are often almost invisible, fixed tightly in web-like patterns to the submerged rock surfaces. I've been fortunate enough to discover sites where *U. neottioides* formed beautiful mats with thousands of flower scapes bearing tens of thousands of tiny greenish-white, yellowish-white, or cream flowers. Each peduncle bears 20 or more flowers and may reach 30cm in height (Taylor 1989), always flowering above the water level. Once at the Chapada dos Guimarães I observed *U. neottioides* right after sunset and it seemed to me as if the flowers were slightly closed, with the upper lip bending together with the three lobes of the lower lip.

The leaves of *U. neottioides* are unique in that they grow not only from the stolons, but also from the submerged, lowermost parts of the peduncles (Taylor 1989). Some kind of mucilage is produced by the leaves, which are long and feathery. At the Chapada dos Veadeiros I collected plants with leaves up to 20cm in length. The traps are extremely small and not very abundant either on the leaves or on the stolons, though at the Chapada dos Guimarães I've found leaves bearing numerous large red traps.

U. neottioides forms Section Avesicaria together with *U. oliveriana*, a species native to Brazil, Colombia, and Venezuela (Taylor 1989). In Brazil, *U. oliveriana* has only been collected in the states of Pará, Rondônia, and Goiás (Taylor 1989). A few main differences between *U. oliveriana* and *U. neottioides* are that the former has unbranched stolons, longer pedicels, and small, "normal-looking" *Utricularia* leaves (Taylor 1989). Unfortunately, I still haven't come across *U. oliveriana* in the wild. *U. neottioides* is often found growing in spots of strong current in streams. It's a mystery to me how seeds are able to fasten themselves to and germinate on rocks in swift-flowing water. In this case, I imagine the seeds could have originally germinated in shallow water near the streamsides and then the plants could have spread slowly over the rocks to the central parts of the stream. The seeds in Section Avesicaria are said to be sticky (Taylor 1989), which would help in anchoring themselves to rocks. They probably only become sticky after contact with water, since the ones I've collected from dead peduncles are always dry.

Maybe the seeds are not truly shed and actually germinate directly from the fruit

while still on the flower scape. This would be an advantage since loose seeds in the water will surely be carried further downstream than a dead peduncle which will get stuck somewhere among the rocks sooner. Or maybe the flower scapes could bend over into the water once dead, while remaining attached to the stolons. That would allow the seeds to germinate directly from the fruit onto the submerged rocks.

Of course these would only work if the seeds maintain their viability after drying out, which is usually not the case with aquatic *Utricularia*. I'm not sure how it works for *U. neottioides*, but I've seen dead plants covering the dry bed of an annual stream at the Chapada dos Guimarães. I don't think it's likely that a few fresh seeds were brought over by birds, wind, or whatever, and to have then developed into a fair-sized colony in a single season. Most likely, this population regenerates each year from a good quantity of seeds which just sit on the streambed until the wet season arrives. Maybe the dead scapes only release the seeds after the dry season is over, with the advent of rain.

Only on two occasions have I seen *U. neottioides* growing in a habitat other than bare submerged rocks. At the Chapada dos Guimarães I found plants growing in gravel mixed with sand in a shallow stream, which is not too strange, but was surprised when I discovered plants at the Chapada dos Veadeiros growing in reddish dirt covering a streambed. Just to make sure, I even dug below the plants with my hands to be certain that the dirt wasn't only a thin layer above bare rock.

I've brought back live plants from my trips, but these never last very long in cultivation, rotting off in stagnant water. *U. neottioides* grows in a very specific habitat and to cultivate it, you'd probably have to have a stream in your backyard. Live plants would have to be brought from the wild and quickly secured to rocks in your stream. Maybe gravel, sand or some type of soil mix might work too. But even if you did get live *U. neottioides* to a stream near you house, there's the problem of water pH and chemical composition, which are probably very important for the survival of this exotic *Utricularia*.

References:

Taylor, Peter. 1989. The Genus *Utricularia* - A Taxonomic Monograph. Kew Bulletin Additional Series XIV, Royal Botanic Gardens, Kew.



Figure 1. *Utricularia neottioides* growing in a shallow, rocky stream near Chapada dos Veadeiros, Brazil. Photo by Fernando Rivadavia.

News & Views

Michael McRoberts, Ph.D. (740 Columbia, Shreveport, LA 71104)

He sent in a letter alerting us that the US Army is trying to annex the Vernon District of the Kisatchie National Forest into Fort Polk in Louisiana. The Vernon District is one of the few relatively intact portions of the western Gulf coastal plain and it contains the few remaining high quality *Sarracenia alata* bogs of this region. Although *S. alata* is fairly common further east, you will recall that there is a break in the population in eastern Louisiana and the western disjunct populations have some interesting variations and ecological differences. They should be saved.

This transfer is apparently being attempted “quietly” between the Departments of Defense (DOD) and Agriculture. In order to avoid the required public hearing and environmental impact studies, DOD wishes to accomplish the transfer by means of legislation, probably through a “minor” bill or rider during a busy session when it would be little noticed.

I (DES) did some checking and found that Fort Polk was mainly into tank training at one time. Tanks can do horrific damage in boggy areas. However, the tanks have been transferred to Ft. Hood, Texas, which is already a tank training facility. Ft. Polk is now engaged in light artillery and foreign infantry training. These activities would probably be less impacting than tanks, but could still be a destructive problem. Access would also quite likely be limited for even serious students and CP aficionados.

To be fair, many military facilities are participating in very active conservation activities, particularly notable being Eglin Air Force Base in the Florida panhandle, Ft. Bragg (US Army) in North Carolina, and Camp Pendleton (Marines) in California among many others. The natural areas are maintained with studies and burning when appropriate, and military activities are mainly directed around them. Also, many areas of these large preserves are open to the public when there is no military activity near them.

If Ft. Polk does indeed acquire this important area, we would hope that it would receive similar treatment, but at this stage we cannot be certain. Various conservation organizations (who know whom to talk to in D.C.) such as the Sierra Club, Audubon Society, Nature Conservancy, and others are already active in trying to prevent this transfer. These organizations are not light weight and they know their way around these situations.

ICPS members may wish to know what they can do as individual citizens. The Louisiana Senators who would be concerned with possible legislation as mentioned above are J. Bennett Johnston (202-224-5824) and John Breaux (202-224-4623). These are their Washington, DC phone numbers. To write them, address their names care of U.S. Senate, Washington, DC 20515. However, the way politics work in this country, Louisiana Senators are not likely to pay much attention to the writings of out of state individuals who are involved with what they perceive as an intrastate Louisiana problem. Likewise, if you live in another state, your own Senators are likely to show no concern with what they would perceive as a Louisiana problem. We all know that the problem of conservation is global, but that is not the way politics work. So, Louisiana members are encouraged to call or write their Senators, and to encourage non-ICPS friends who are concerned with conservation to do the same. Also, nonresidents of Louisiana should alert any conservation minded friends within the state to contact their Senators.

Bruce Pierson (Lot 5 Riverpark Court, Riverview, M/S 236, Maryborough , QLD 4650, Australia)

A short note by Bruce Pierson in the March, 1996 issue of the BULLETIN OF THE AUSTRALIAN CARNIVOROUS PLANT SOCIETY reports further on the use of smoke in facilitating difficult to germinate seeds. Readers will recall the placement of burning paper on pots of recently sown seed to stimulate germination of such species as *Byblis gigantea*. This supposedly simulated the frequent natural fires in the species' native habitat which facilitated seed germination. Efforts toward using chemicals disclosed that solutions of gibberellic acid, a natural growth hormone produced by fungi, could accomplish the same thing without fire.

More recent work has suggested that it is not the heat of the fire or the steam produced by the fire over damp ground that helps germination but that products in the smoke of the fire did the trick. Now, instead of having to hole up in a tent with a fire inside holding your recently seed sown pots so they could be smoked, it has been shown that whatever is in the smoke that stimulates germination is water soluble--It can be bottled!

To prepare your smoke solution, this reviewer would suggest the following to start. Secure a piece of hardware cloth or sturdy metal screening and make a small pile of grass and brush on it and suspend it off the ground so you will have a bottom updraft. Find a large metal funnel and place a rubber or plastic tubing on the stem end. Ready your bottle of water.

Light fire to the brush on the screen, invert the funnel over it resting the funnel on the screen (Do not touch the funnel after this stage until it is well cooled after the fire!) and place the open end of your tube into your container of water. Smoke should bubble into it. I do not know how long one must bubble, but pretty much burn out your brush fire.

You can now use your "smoke water" several ways. One can presoak seed in some of it for a few hours, or water your sown seed into the soil in your pot with it. It supposedly works. Good luck, and science marches on!

(We will entertain additional procedures for preparing smoke water, the most original and elegant garnering the most "oohs" and "aahs".)

Naoki Tanabe (1-4-6 Minami Hanazono, Hanamigawa-ku, Chiba-City, Chiba-Pref.,262, JAPAN)

I have established in the summer of 1995 a new society called the Japanese Carnivorous Plants Society(JCPS). I am also an ICPS member. Our society has 200 members and publishes a journal 4 times a year called The Carnivorous Plants Information Journal. Enclosed are our first 3 issues which are handmade and written in Japanese. The plan for the 4th journal is a special issue on *Pinguicula* which will be printed in English. I will send it to you when printed. I would like for everyone to read our journal and to write articles on growing techniques or habitat information of carnivorous plants. I thank you for your time. Do you know Yukio Koshikawa? He is my friend and very famous in Japan. He built the NIP botanical garden and also has a journal of NIP.

A New Cultivar of *Dionaea muscipula* Ellis

Ron Gagliardo, Curator of Tropical Plants

The Fuqua Conservatory, Atlanta Botanical Garden, Atlanta, Georgia 30357 USA

Through breeding efforts in the support greenhouses of the Atlanta Botanical Garden, a new all red form of the Venus Flytrap (*Dionaea muscipula*) has been created. The parents of this new cultivar were an all red form (female) and a “toothless” or fine tooth form (male) of *Dionaea muscipula*. The all red parent is apparently the same clone that was isolated by Mr. Theo de Groot in Holland over a decade ago and has been in limited cultivation here in the United States since. The toothless form was originally isolated by Mr. Thomas Carow in Nudlingen, Germany. Twenty (20) viable seeds were collected and of these, seven clones were established in tissue culture. Of the seven clones

grown in vitro, one showed enhanced red coloration and vigor and upon subsequent planting out into soil, immediately developed an astonishing deep burgundy coloration in the leaf blade and trap. This clone was also far superior to any of the parents in terms of growth rate and vigor. The description follows:

Dionaea muscipula ‘Akai Ryu’

Growth habit and flower morphology are typical for this species. The leaf petiole,



Figure 1. *Dionaea muscipula* ‘Akai Ryu’ young plant produce from tissue culture. Photo by Ron Gagliardo.



Figure 2. *Dionaea muscipula* ‘Akai Ryu’ mature traps. Photo by Ron Gagliardo.

blade and trap exhibit dark maroon to burgundy coloration. Any green coloration has only been noted around the center of the plant in mid-winter. The entire trap, interior and exterior, exhibits dark burgundy coloration throughout the year. Grown under laboratory conditions, where nutrient levels can be comparatively high, the plants still exhibit partial burgundy coloration in the traps and leaf blade.

Etymology: This clone is herein described as *Dionaea muscipula* ‘Akai Ryu.’ The words “Akai Ryu” are Japanese for “Red Dragon.”

This cultivar is currently being propagated for commercial release by Agristarts III, Apopka, Florida. New selections of *Dionaea muscipula* using ‘Akai Ryu’ as parent stock are in progress.

Drosera graminifolia

Fernando Rivadavia, Rua Inacio Pedroso 230, C.E.P.,
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Drosera graminifolia is one of the largest *Drosera* species in all of the Western Hemisphere, together with *D. ceendensis* (from northeastern Venezuela), *D.*

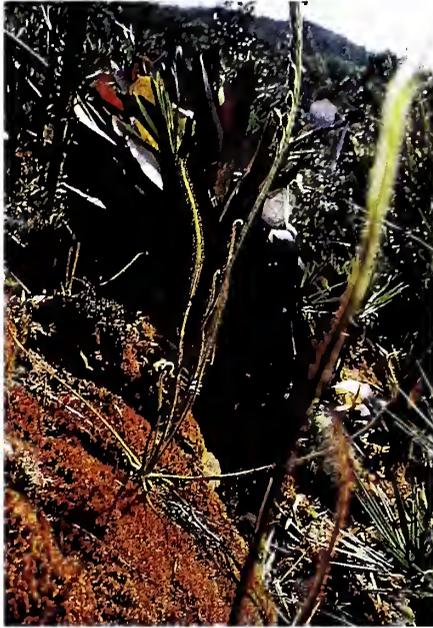


Figure 1. *Drosera graminifolia* growing in orange *Sphagnum* sp. at Caraca, Brazil, altitude ca. 1800 m. Photo by Fernando Rivadavia.

meristocaulis (from the Neblina Peak on the border between Brazil and Venezuela), and *D. chrysolepis* (from the Cipó Range in southeastern Brazil). *D. graminifolia* was described in 1824 by Auguste de Saint-Hilaire, based on material collected during his travels through Brazil in the early nineteenth century (Saint-Hilaire, 1824). *D. graminifolia* is like a robust *D. filiformis* and is only known to grow on the Serra do Espinhaço (Espinhaço Range), an ancient sandstone formation which cuts the state of Minas Gerais (southeastern Brazil) from north to south. Erosion is very high on these mountain tops and the vegetation consists mostly of low plants growing on rocks and/or in sand. In Brazil we call this "campo rupestre" vegetation (see CPN 22:4), which can be found on other highlands around the country and even extending north to the famous tepuis of the Roraima Highlands in northern Brazil plus southern Venezuela and Guyana. Some angiosperm families common in these harsh habitats are: Eriocaulaceae, Velloziaceae, Gramineae, Cyperaceae, Xyridaceae, Compositae, Melastomataceae, Bromeliaceae, Orchidaceae, and Cactaceae, not forgetting Droseraceae and Lentibulariaceae (including both *Utricularia* and *Gentlisea*).

D. graminifolia is a perennial which often forms short, stocky stems, which in rare cases of very old plants may be up to 15cm in length. Leaves can grow over 30cm in length (the petiole being only around

D. meristocaulis (from the Neblina Peak on the border between Brazil and Venezuela), and *D. chrysolepis* (from the Cipó Range in southeastern Brazil). *D. graminifolia* was described in 1824 by Auguste de Saint-Hilaire, based on material collected during his travels through Brazil in the early nineteenth century (Saint-Hilaire, 1824). *D. graminifolia* is like a robust *D. filiformis* and is only known to grow on the Serra do Espinhaço (Espinhaço Range), an ancient sandstone formation which cuts the state of Minas Gerais (southeastern Brazil) from north to south. Erosion is very high on these mountain tops and the vegetation consists mostly of low plants growing on rocks and/or in sand. In Brazil we call this "campo rupestre" vegetation (see CPN 22:4), which can be found on other highlands around the country and even extending north to the famous tepuis of the Roraima Highlands in northern Brazil plus southern Venezuela and Guyana.

Some angiosperm families common in these harsh habitats are: Eriocaulaceae, Velloziaceae, Gramineae, Cyperaceae,



Figure 2. *Drosera graminifolia* peduncle with four open flowers at Grao Mogol, Brazil, ca. 1000 m altitude. Photo by Fernando Rivadavia.

2cm long) and under strong sunlight often become reddish with age. I've never been able to reproduce this species by leaf cuttings nor have I observed leaves close to the ground budding naturally (neither in cultivation nor in the wild), as I have for other native species. Large, triangular, translucent, golden-bronze stipules cover the base of each leaf and envelop the new ones emerging in the center. The peduncles and sepals are covered with short, sticky, gland-tipped hairs. In northern Minas Gerais I've observed an occasional long, red tentacle on the sepals, like the ones present on the leaves.

D. graminifolia thrives in seepages and next to streams in live *Sphagnum*, common mosses, sand, sand mixed with rocks, or in small cracks on bare sandstone. I recently discovered why this species is most numerous on "islands" of vegetation among rocks or on the bare rocks themselves (both these types of habitats being irrigated by trickling water during the wet season), instead of occupying the apparently more homely habitats in wetter soils nearby. Bushfires are common in the dry season and will easily barbecue *D. graminifolia*, since each plant is usually surrounded by a tangled, black mass of highly-flammable dead leaves. Though new plants can grow back from the roots, these shoots probably take a few years to mature and flower, not to mention that new fires may render the effort useless.

Thus pockets of isolated vegetation on rocks are likely to be safer from raging wildfires, as are the plants clinging to the open sandstone surfaces. It still surprises me though how this species can survive the dry season on bare rocks, when their natural irrigation is cut off for a few months. I imagine the shadow of the dead leaves helps maintain the base of the plants cooler. They probably also help concentrate dew at night and dissipate it slowly during the day, keeping the air around the base of the plants less dry.

D. graminifolia peduncles can be over 50cm in height and are almost always bifurcated a few times at the top. Thus a few flowers may often be found open at the same time on a single flower scape (I've seen up to six). The flowers are around 2cm in diameter and are pink-lilac when in full sunlight, losing some of the pink in shadier conditions. In September '94 I discovered a few white-flowered *D. graminifolia* in northern Minas Gerais, growing among typical pink-lilac-flowered plants. This was around the village of Grão Mogol and the leaves of these albino-flowered specimens had the normal red pigmentation.

D. graminifolia can be found in flower all year long, but there is a well-defined flowering season in late winter and early spring (July to September), which is the end of the dry season. Each peduncle bears numerous flower buds (up to around 45) and each fruit produces a large amount of seeds. The total output of seeds per peduncle is superior to that of any other *Drosera* species I know of (with the probable exception of *D. capensis*), not to mention that every plant usually sends up two peduncles during the flowering season and maybe more out of season.

Geographically there seem to be three separate populations of *D. graminifolia*, which could probably be classified as three distinct subspecies in the future. The above paragraphs describe mostly the northern population, but may be applied to the other two populations, except for a few details mentioned below. I studied the northern plants around the villages of Grão Mogol, Itacambira, and Botumirim, growing from around 850 to 1300m in altitude. The TYPE *D. graminifolia* represent the southern population and were collected by Saint-Hilaire at the Serra do Caraça, probably my favorite place for hikes and where I saw my first wild CPs in Brazil, during my high school senior trip in May '90 (see CPN 20:3 and 20:4). This southern population is smaller than the northern one and can be found between 1700 and 2000m of altitude

on peaks of the Caraça Range and other ranges extending a bit further west (all subranges of the Espinhaço Range). The following description is based on plants from Caraça, assuming plants from the rest of the southern population are uniform with those studied during my five trips to Caraça and brought into cultivation.

The southern plants flower almost exclusively from February to March, though there's a secondary and less important flowering period around August and September. The flowers of this southern form are lighter in color and the petals are narrower, making the flowers more star-shaped than those of the northern plants which have rounder petals. A few other differences have been observed, including that the leaves of the southern plants don't turn red with age and the tentacles on the leaves are either smaller or not as red themselves.

The third form of *D. graminifolia* occupies a central position in relation to the two other possible subspecies described above. I know very little about this population, which is concentrated around the historical town of Diamantina, since I've only studied these *D. graminifolia* in the wild once in early '92 (see CPN 22:4). The specimens I collected there and cultivated for a few years provided additional information plus herbarium seen at the University of São Paulo helped give an idea of the geographic extension of this and the other two *D. graminifolia* populations. I know there is gap between the central and southern populations, but I'm not sure if this gap exists between the central and northern ones.

D. graminifolia probably grows between 950 and 1300m in altitude in this central region and doesn't seem to be nearly as abundant locally as the northern and southern populations are in their respective areas. The few specimens I found were growing in sandy soil in two colonies by the same stream. The plants themselves are more similar to those of the northern form while the flowers (which I later saw in cultivation), are more similar to those of the southern form. The plants from Diamantina flowered every few months in cultivation, but I suspect that in the wild their flowering season is concentrated at the end of the dry season, like the northern plants.

Together with *D. graminifolia* plus other species of *Drosera*, Saint-Hilaire published a *D. spiralis* (Saint-Hilaire, 1824), based on plants he'd collected in the Diamantina region. Later on, in 1874, Von Martius described a *D. brasiliensis* from the same area. Both of these were synonymized to *D. graminifolia* by Diels (Diels 1906), but show that I wasn't the first to observe differences between the TYPE specimens from Caraça and the specimens from the Diamantina region.

I believe that, as a taxonomist, Saint-Hilaire must have been a genius. After a few years botanizing here in Brazil, I've come to the conclusion that most of his original publications on Brazilian *Drosera* will turn out to contain much more truth than the publications of the "couch taxonomists" who came after him and made a big mess of *D. montana*, *D. villosa*, *D. graminifolia*, and all the taxons presently included under these species, by believing that the simple analyses of Saint-Hilaire's and other author's TYPE herbarium was taxonomically sufficient!

Saint-Hilaire's taxonomical work was based on profound understanding of plant ecology, which he probably acquired during the years he spent travelling through the interior of Brazil. Very often, field work is sadly still not recognized as an essential part of taxonomy. As I see it, how can one work on herbarium alone when he has no idea how those few specimens from whole plant populations once functioned in nature? What characteristics of theirs are variable and under what conditions? At least cultivating the plants would be a big help! Ecology is a very complicated area and it seems to me that taxonomists tend not to give much importance to ecology simply because they're afraid of it! It's not easy to pick out the "bad" taxonomists since

taxonomy is a very subjective science and will probably continue thus as long as we don't come up with a good definition for a species, which might never exist.

Unfortunately, there's another variety of the "couch taxonomists" called the "vulture taxonomists", who are continuously circling over other people's honest hard work, competing aggressively with each other while searching for remains where they can rob species for "themselves" (they're very possessive!) and save all the sweat. To give more credibility to their own names, we often see these "vultures" attempting to throw as much mud as possible on the publications of others. After all, criticizing is easy, but creating is a whole different story.



To finalize, how can you not help admiring an adventurer like Saint-Hilaire who faced years of hardship and unknown diseases in the wild interior of Brazil almost 200 years ago, opening trails through hostile, unexplored lands? People think I'm crazy when they hear the stories of my 1990's expeditions, so imagine what it must've been like back then!!

Figure 3. Fernando Rivadavia next to *Drosera graminifolia* colony at Caraca, Brazil, ca. 1900 m altitude. Note other colonies in shallow soils on these rocks.

References:

- 1.) **Diels, L.** 1906. Droseraceae in A. Engler (ed) Das Pflanzenreich 26 Heft IV. Leipzig.
- 2.) **Rivadavia, F.** 1991. Carnivorous Plants of Caraca (Brazil), South America. Carnivorous Plant Newsletter. Vol.20: 3, p.79-81.
- 3.) **Rivadavia, F.** 1991. Back to Caraca. Carnivorous Plant Newsletter. Vol.20: 4, p.110-113.
- 4.) **Rivadavia, F.** 1993. CPs of Campos Rupestres. Carnivorous Plant Newsletter. Vol.22: 4, p.109-113.
- 5.) **Saint-Hilaire, A.** 1824. Droseraceae in Histoires des Plantes Les Plus Remarquables du Bresil et Paraguay.
- 6.) **Schlauer, J.** 1986. Nomenclatural Synopsis of Carnivorous Phanerogamous Plants. Carnivorous Plant Newsletter. Vol.15: 3&4.



Figure 4. *Drosera graminifolia* growing in dry stream bed ca. 1050 m altitude at Grao Mogol, Brazil. Photo by Fernando Rivadavia.

Literature Review

Crow, G. E. 1992. The genus *Utricularia* (Lentibulariaceae) in Costa Rica 1992. *Brenesia* 38:1-18.

The backbone of this review paper is a key for the ten species of the genus *Utricularia* in Costa Rica. This is followed by brief but diagnostic descriptions of each species with habitat and location descriptions. There are then dot maps showing provincial locations, and good line drawings of some of the species. A useful reference for those botanizing Costa Rica.

de Stefano, Rodrigo Duno and Alastair Culham. 1995. Dos especies nuevas del genero *Drosera* (Droseraceae) en Venezuela y otros commentaries taxonomicos. *Novon* 5:241-245.

En Espanol

Drosera hirticalyx is described as closely allied to *D. roraima*, as indicated in the nice line drawings included. The difference is increased pubescence of the new species' calyx, somewhat larger leaves with increased pubescence of the petiole, and the seed of the new species is more spheroid than *D. roraima* which has a somewhat elongate seed.

Drosera yutajensis is most closely allied to *D. villosa* and *D. arenicola*, but with shorter leaves and stamens.

The "other taxonomic comments" are that the authors consider *D. colombiana* and *D. panamensis* as conspecific with *D. cayennensis*. *D. esmeraldae* is reported for Colombia, and the occurrence of a *D. communes* in Venezuela is disputed.

(Ed. comment-- The discriminating differences of the proposed two new species seem very minor and I think further field and greenhouse studies are indicated. The most interesting character is the seed difference in *D. hirticalyx* vs. *D. roraima*).

Schnell, Donald E. 1995. A natural hybrid of *Drosera angina* Huds. and *Drosera linearis* Goldie in Michigan. *Rhodora* 97:164-170.

The author reports this hybrid from nature for the first time. The hybrid nature of the plants is determined by taximetric, cytologic and biologic methods. The hybrid is very vigorous in culture but is quite sterile. It tends to go into active growth earlier and respond more vigorously in the greenhouse than either parent. The hybrid was found in fens of northern lower Michigan. (Reprints: Don Schneil, Rt. 1, Box 1 45C, Pulaski, VA 24301).

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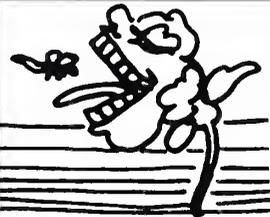
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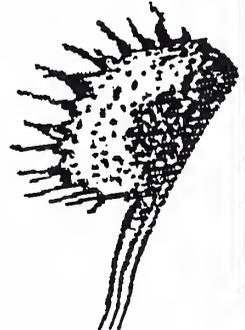


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